JGP-150

4/5/1 (Item 1 from fil : 351)
DIALOG(R)File 351:DERWENT WPI

009506371 WPI Acc No: 93-199907/25
XRAM Acc No: C93-088544
XRPX Acc No: N93-153577
Waterproof sheet for embedding waste in soil esp. landfill - used to sandwich waste between soil layers, comprising gas permeable sheet e.g. of stretched porous PTFE, preventing waste leaching
Patent Assignee: (NIGO) JAPAN GORE TEX INC
Number of Patents: 001
Number of Countries: 001
Patent Family:

CC Number	Kind	Date	Week	
JP 5123659	A	930521	9325	(Basic)

Priority Data (CC No Date): JP 91225302 (910812)
Abstract (Basic): JP 05123659 A

Air pipings through which the air is supplied are placed at the bottom of the land to be filled up; air pipings are covered with a waterproof gas permeable sheet; a layer of waste is formed over waterproof sheet; another waterproof gas permeable sheet is covered over layer of waste; then a top layer of soil is formed.

A waterproof gas permeable sheet is also claimed, which is made of a porous film at least one face being partly laminated with a protective film.

The porous film is pref. a stretched porous film of polytetrafluoroethylene or it is made of polyolefin, polyurethane, polyester, polyether, polyvinylchloride, or cellulose.

USE/ADVANTAGE - Used to form the bottom layer of a land-fill. Harmful waste embedded in the land is hardly dissolved out, because water penetration from outside can be effectively prevented by the waterproof sheets. Dwg.0/2
File Segment: CPI
Derwent Class: A94; P43; Q42; A18;
Int Pat Class: B09B-001/00; B09B-003/00; E02B-003/12
Manual Codes (CPI/A-N): A12-S07A; A12-W11F
Plasdoc Key Serials: 0209 0210 0231 0232 0759 0947 1279 1291 1294 1982 2514 2522 2547 2653 2708 2736 3251 3256
Polymer Fragment Codes (AM):
001 014 04- 041 046 061 062 063 064 087 143 144 147 150 252 253 435 494 502 53& 532 533 535 540 575 58& 595 61- 623 626 688 724

Work Copy

JP 5123659

POLYGLOT INTERNATIONAL

Global Management of Language-Related Projects

340 Brannan Street, Fifth Floor
San Francisco, CA 94107 • USA

Tel (415) 512-8800
FAX (415) 512-8982

TRANSLATION FROM JAPANESE

JGP-150

(Document Title)	Patent Application
(Registration Number)	JGP-150
(Date of Submission)	August 12, 1991
(Attention:)	Wataru Fukazawa, Director General of the Patent Office
(Title of the Invention)	**Waste Disposal Method and Gas-Release Water Barrier Sheet**
(Number of Claims)	4
(Inventor)	
(Name)	Yoshihiro Chikamori
(Applicant)	
(Business Classification)	000107387
(Name or Title)	Japan GORETEX, Ltd.
(Representative)	Toru Iida
(Agent)	
(Business Classification)	100058974
(Patent Attorney)	
(Name)	Kazuichi Shirakawa
(Indication of Fees)	
(Payment Method)	Prepayment
(Payment Ledger Number)	016414
(Payment Amount)	¥14,000
(List of Submitted Documents)	
(Document Title)	Specification - 1

(Document Title)	Figures - 1
(Document Title)	Summary - 1
(Power of Attorney Number)	9106033

Document Title: Specification

Title of the Invention: Waste Disposal Method and Gas-Release Water Barrier Sheet

Claims

[Claim 1] A waste disposal method, characterized by the fact that, at a landfill site, an air supply tube in which ventilation holes have been made is positioned at the lowermost layer, said air supply tube is covered over with a gas-permeable water barrier sheet, a waste layer made up of a suitable amount of waste is formed over said water barrier sheet, said waste layer is covered over with a gas-release water barrier sheet, over which is suitably formed an uppermost layer of earth, and air is supplied to the above-mentioned lowermost layer portion through the above-mentioned air supply tube.

[Claim 2] The gas-release water barrier sheet used in Claim 1, characterized by the fact that a waterproof and gas-permeable sheet, comprising a porous film on at least one side of which has been partially bonded a protective layer, is employed for all or part of [said gas-release water barrier sheet].

[Claim 3] A gas-release water barrier sheet as defined in Claim 2, wherein the porous film is a drawn, porous film of polytetrafluoroethylene.

[Claim 4] A gas-release water barrier sheet as defined in Claim 2, wherein the porous film is based on a polyolefin, polyurethane, polyester, polyether, polyvinyl chloride, or cellulose.

Detailed Description of the Invention

[0001]

Field of Industrial Utilization

The present invention relates to a waste disposal method employed at waste disposal sites, etc., and to a gas-release water barrier sheet used in said method.

[0002]

Prior Art

Landfill is one method of waste disposal, and one such landfill method is a sandwich process, in which a covering layer of earth about 50 cm deep is applied for about every 3 meters of thickness of the waste layer.

[0003]

Problems Which the Invention is Intended to Solve

With a conventional method such as this, however, since the earth is heaped directly on top of the waste layer, rainwater seeps down and pools in the waste layer, where it obstructs air permeation. This results in decomposition by anaerobic bacteria, and generates foul-smelling gases or harmful components. Also, any harmful components contained in the waste are leached out by the rainwater, which can result in ignition of the gases, the generation of noxious odors, soil contamination, groundwater contamination, and water fouling during and after landfilling, and these environmental problems mean that it will be a long time before the land can be used again after landfill.

[0004] Favorable disposal results are obtained when aerobic bacteria are utilized in such waste disposal, but a characteristic of aerobic and anaerobic bacteria is that they reject each other, and once anaerobic bacteria have been generated, the action of aerobic bacteria is difficult to realize until said anaerobic bacteria have completely died out. Consequently, it takes at least several years, and in some cases several decades, for waste that has been buried as above to be effectively digested.

[0005] Thus, since environmental pollution in the form of the noxious gases and harmful substances created by anaerobic bacteria cannot be avoided, the land that is used for the waste disposal must be sufficiently remote from populated areas, and furthermore, once land has been used for landfill it cannot be used for other purposes for a long time, as mentioned above. If it were to be used before enough time had passed for this long-term digestion, then noxious odors and the like would be encountered and the environment will be unsuitable.

[0006]

Means Used to Solve the Above-Mentioned Problems

The present invention is the result of repeated study aimed at solving the above-mentioned problems encountered with conventional methods, which led to the

development of advantageous waste disposal through the use of a specific sheet, and comprises the following structure.

[0007] (1) A waste disposal method, characterized by the fact that, at a landfill site, an air supply tube in which ventilation holes have been made is positioned at the lowermost layer, said air supply tube is covered over with a gas-permeable water barrier sheet, a waste layer made up of a suitable amount of waste is formed over said water barrier sheet, said waste layer is covered over with a gas-release water barrier sheet, over which is suitably formed an uppermost layer of earth, and air is supplied to the above-mentioned lowermost layer portion through the above-mentioned air supply tube.

[0008] (2) The gas-release water barrier sheet used in (1) above, characterized by the fact that a waterproof and gas-permeable sheet, comprising a porous film on at least one side of which has been partially bonded a protective layer, is employed for all or part of [said gas-release water barrier sheet].

[0009] (3) A gas-release water barrier sheet as defined in (2) above, wherein the porous film is a drawn, porous film of polytetrafluoroethylene.

[0010] (4) A gas-release water barrier sheet as defined in (2) above, wherein the porous film is based on a polyolefin, polyurethane, polyester, polyether, polyvinyl chloride, or cellulose.

[0011]

Effect of the Invention

A porous film having a protective cloth partially bonded to at least one side is employed for all or part of a gas-permeable sheet and a gas-release water barrier sheet to create water barrier sheets, which allows these sheets to be treated as integral units and to have suitable strength in the porous films formed as relatively thin layers.

[0012] The gas-release water barrier sheet prevents rainwater from penetrating to the waste layer, and prevents the harmful substances in the waste from being leached out by the rainwater and polluting the soil.

[0013] The water barrier sheets maintain gas-permeable conditions in the waste, prevent the decomposition of the waste by anaerobic bacteria as a result of rainwater penetrating into the waste, and thereby prevent the generation of unpleasant odors and gas and promote the digestion [of the waste] by aerobic bacteria.

[0014] Suitable digestion by aerobic bacteria is achieved since, as mentioned above, the waste layer is kept in a gas-permeable state and air is supplied from an air supply tube.

[0015] The supplied air, the gas generated from the waste, and water vapor (water originally contained in the waste, or water that has adhered during the disposal process, for example) are released to the atmosphere through the gas-release water barrier sheet.

[0016] The gas-permeable water barrier sheet formed between the air supply tube and the waste layer is designed so that the water from above will not permeate around the air supply tube and interfere with gas permeation in this area, and air is suitably dispersed from the air supply tube and supplied to the waste layer.

[0017]

Practical Examples

Specific embodiments of the present invention as described above will now be given through reference to the appended figures.

[0018] Figure 1 is a detail cross section illustrating the filled state in the waste disposal method pertaining to the present invention. Figure 2 is a cross section of the porous film portion of the gas-release water barrier sheet. **1** is a waste layer, **2** is a gas-release water barrier sheet, **3** is an earth layer, **4** is an air supply tube, **5** is a blower, **6** is a porous film, **7** is a protective cloth a, **8** is a protective cloth b, and **12** is a gas-permeable water barrier sheet.

[0019] The air that is sent as needed from the blower **5** or the like is supplied to the air supply tube **4** at the lowermost layer, and goes to the waste layer **1** from ventilation holes provided in the side of said tube. The supplied air permeates through the waste layer **1** and is supplied to the aerobic bacteria, which promotes their decomposing and digesting action on the waste, and then reaches the gas-release water barrier sheet **2**. Since the gas-release water barrier sheet **2** is waterproof and gas-permeable, the air that reaches it also permeates the gas-release water barrier sheet **2** and is released into the atmosphere.

[0020] The feed of air from the air supply tube **4** is performed at suitable time intervals, to which end the blower **5** is intermittently actuated. Alternatively, air supply tubes that open above ground can also be provided to all or part [of the system] and the air thereby released to the atmosphere.

[0021] It is clear that the air supply tube **4** and the sheets **2** and **12** can be permanently buried during disposal according to the present invention, but since the present invention makes it possible for aerobic bacteria to proliferate rapidly and for the digestion of the waste to be completed in a relatively short period, it is also possible to dig up the air supply tube **4** and the sheets **2** and **12** after the digestion treatment and

reuse these components. If they are not to be reused, the air supply tube **4** and the sheets **2** and **12** should be lightweight and small, and if possible, should be designed so that they will be digested along with the waste. When they are to be reused, materials with sufficient durability should be employed.

[0022] The porous film used in the gas-release water barrier sheet **2** can be a porous polyolefin, a porous polyurethane, or the like, but the use of porous, drawn polytetrafluoroethylene is preferable in the present invention. The protective cloths **7** and **8** of the porous film can be any organic or inorganic fabric, nonwoven cloth, net, or the like that has good gas permeability and high strength.

[0023] The porous film and the protective cloth are partially bonded because gas permeability (moisture permeability) is lost in the bonded portions. Since the above-mentioned porous, drawn polytetrafluoroethylene film has a microscopic porous texture as a result of its drawing, the above-mentioned objective can be achieved with an extremely thin membrane, but because of the thinness of this membrane, it is extremely susceptible to damage, so it is best to provide a protective cloth to both sides.

[0024] It is preferable to use a waterproof, gas-permeable porous film over the entire surface of the gas-release water barrier sheet **2**, but when this would entail prohibitive cost, the amounts of moisture and gas permeation and the surface area required of the gas-release water barrier sheet can be calculated in cases when the amount of water vapor and gas to be generated can be estimated, so the cost can be kept down if the porous film is used only as needed in certain portions over 5 to 80%, and preferably 20 to 60%, of the total surface area of the gas-release water barrier sheet.

[0025] When the porous film is thus used only for part of the gas-release water barrier sheet, it is preferable for the remainder of said sheet to be a gas-impermeable or gas-permeable resin membrane, sheet, or the like.

[0026] The porous film **6** used for the above-mentioned water barrier sheets **2** and **12** should have a maximum pore diameter of 0.05 to 3 μm, and preferably 0.2 to 1 μm, a porosity of 40 to 95%, and preferably 75 to 90%, and a thickness of 10 to 100 μm, and particularly about 30 to 80 μm.

[0027] As a general rule, the gas-permeable water barrier sheet **12** located at the bottom of the waste layer **1** is the same as the above-mentioned gas-release water barrier sheet **2**, but the basic purpose of this gas-permeable water barrier sheet **12** is to disperse the air from the air supply tube **4** sufficiently and supply it to the waste layer **1**. Therefore, it is designed such that the penetration of water and the like around

the air supply tube will be minimized so the air can be effectively dispersed and supplied to the waste layer 1.

[0028] The earth that is heaped above and below the waste layer 1 or the gas-permeable water barrier sheet 12 in the present invention can, for example, be mixed with a suitable amount of branches, fibrous material, or the like to ensure gas permeability and the attendant air supply action in those portions, and to create conditions that are favorable to the growth of aerobic bacteria. It is usually preferable for these branches or fibrous material to be digested along with the waste layer, but in some cases they may be taken out after treatment and used again.

[0029]

Merits of the Invention

With the present invention as described above, the penetration of rainwater into the waste layer can be completely prevented in the landfilling of waste, so the leaching of harmful components contained in the waste can be prevented, and since water tends not to stagnate in the waste, anaerobic decomposition is suppressed and the generation of gases is prevented. Furthermore, the aerobic decomposition of organic matter in the waste is promoted and any gases or water vapor generated from the waste are soon released, so the ground at the waste disposal site stabilizes more quickly, which is very beneficial in that the site can be used for other purposes at an earlier date.

Brief Description of the Figures

Figure 1 is a detail cross section illustrating the filled state in the landfill method pertaining to the present invention. Figure 2 is a detail cross section of the gas-release water barrier sheet of the present invention.

Key: 1 waste layer, 2 gas-release water barrier sheet, 3 earth layer, 4 air supply tube, 5 blower, 6 porous film, 7 protective layer a, 8 protective layer b, 12 gas-permeable water barrier sheet

Document Title: Figures

Figure 1

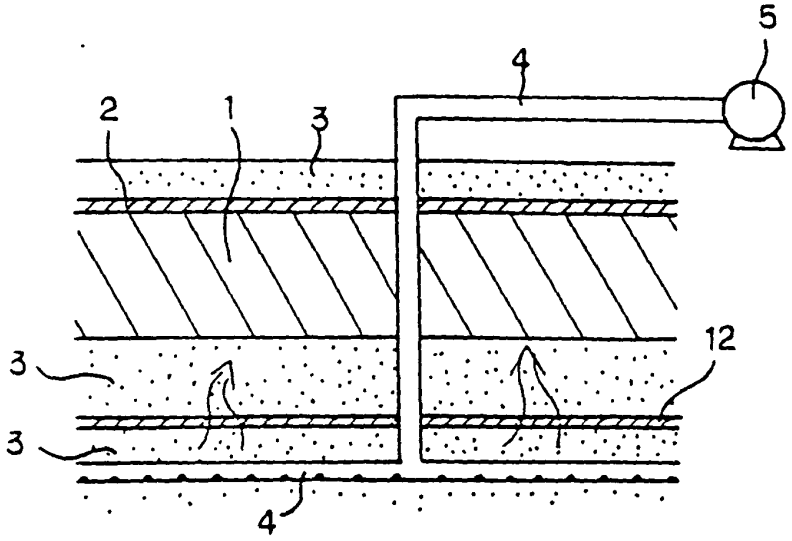
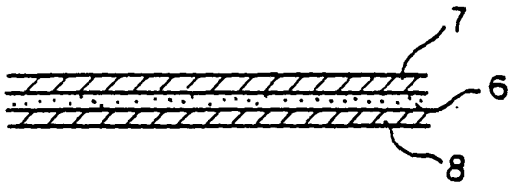


Figure 2



Document Title: Abstract

Abstract

Object: In a landfill process, the penetration of rainwater into the waste layer is prevented, so the leaching of harmful components contained in the waste is prevented, and anaerobic decomposition is suppressed, so the generation of gases is prevented. Furthermore, the aerobic decomposition of organic matter in the waste is promoted and any gases or water vapor generated from the waste are soon released, so the ground at the waste disposal site stabilizes more quickly and the site can be used for other purposes at an earlier date.

Structure: At a landfill site, an air supply tube in which ventilation holes have been made is positioned at the lowermost layer, said air supply tube is covered over with a gas-permeable water barrier sheet, a waste layer made up of a suitable amount of waste is formed over said water barrier sheet, said waste layer is covered over with a gas-release water barrier sheet, over which is suitably formed an uppermost layer of earth, and air is supplied to the above-mentioned lowermost layer portion through the above-mentioned air supply tube.

Selected Figure: Figure 1